DOCUMENT RESUME

ED 382 484 SE 056 336

AUTHOR Jorgensen, Eric L.
TITLE Agriculture and Environmental Education: A Resource Guide for Nonformal Education Programs.
INSTITUTION California Univ., San Jose. Cooperative Extension.
PUB DATE Sep 93
NOTE 32p.
PUB TYPE Guides - Non-Classroom Use (055) -- Reference Materials - General (130)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adult Education; *Agricultural Education; Educational Resources; Elementary Secondary Education; Environment; *Environmental Education; *Nonformal Education; *Resource Materials; Science Curriculum

ABSTRACT

This guide is designed to expand the use of agriculture as a medium for environmental education. It's goal is to increase communication and sharing among farms, parks, schools, museums and other educational settings that utilize agriculture for environmental understanding. An introduction provides an overview of agriculture and education. Subsequent sections contain: (1) a review of seven unique programs in animal sciences, plant sciences, and multicultural education for youth and adults; (2) a listing of educational resources which focuses on new curricula emphasizing hands-on experimental approaches using science processes (including one book, seven curricula, five magazines and journals, and six organizations); and (3) a national directory of 54 environmental education sites focusing on agriculture. Site entries include organization title, contact, mailing address, phone number, and description. (LZ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 382 484

AGRICULTURE AND ENVIRONMENTAL EDUCATION:

A RESOURCE GUIDE FOR NONFORMAL EDUCATION PROGRAMS

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

ERIC JORGENSEN

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

AGRICULTURE AND ENVIRONMENTAL EDUCATION:

A RESOURCE GUIDE FOR NONFORMAL EDUCATION PROGRAMS

By
Eric L. Jorgensen

University of California Cooperative Extension
Santa Clara County
2175 The Alameda, Suite 200
San Jose, California 95126
(408-299-2630)

September 1993

Environmental Education...

"Our ability to stimulate citizenship comprehension of ecological relationships and to extend their capacity for informed judgement and ethical action."

Aldo Leopold

Agriculture

"Landscapes are dynamic. They are a function of four basic processes ...you have to assess the cycling of minerals, the cycling of water, the flow of energy through the food chain, and the status of succession. Then you can consider tools and policies."

Allan Savory

INTRODUCTION

"Agriculture and Environmental Education: Nonformal Education Resource Guide" is designed to expand the use of agriculture as a medium for environmental education. It's goal is to increase communication and sharing amongst farms, parks, schools, museums and other educational settings that utilize agriculture for environmental understanding. This guide identifies a few exemplary programs and curricula, and shares a directory of "teaching farm" organizations.

AGRICULTURE AND EDUCATION: AN OVERVIEW

Globally, the historic consequences of human food and fiber production have changed the flora and fauna of the planet's plains, forests, wetlands and fisheries. The deserts of North Africa were once the grain fields of the Roman Empire. The ancient hardwood forests of the North American Midwest, today are landscaped with corn and soybeans. Farming is the process of manipulating the environment to increase concentrations of human foods and fibers.

Along with this environmental change, most humans have become urban dwellers who are increasingly insulated and divorced from direct understanding of the earth, and only secondarily linked to food and fiber needs.

Environmental educators have focused educational programs on wildlife conservation, natural resources, ecology and human consumption practices. Only recently have environmental educators focused on agricultural settings, examined agriculture's environmental impacts, and researched practices increasing sustainability.

Until recently, agricultural education was viewed by educators as "how to" or vocational education. Today the subject of agriculture in schools, though still largely associated with the tradition of vocational agriculture, has begun to attain a new meaning and purpose. Terms such as "agri-science", "agroecology" and "agricultural literacy" denote new conceptual frameworks integrating agriculture, science, and environment.

The concept of agricultural literacy and its importance was captured in a National Research Council report (National Academy of Sciences, 1988) entitled "Understanding Agriculture - New Directions for Change". It indicated that most urban dwellers do not have a clear understanding of the relationship between society and agriculture. "An agriculturally literate person's understanding of the food and fiber system includes its history and current economic, social and environmental significance to all Americans. This definition encompasses some knowledge of food and fiber production, processing and domestic and international marketing."

Several researchers in California (Rilla et al, 1990) examined teacher and administrator perceptions of and support for agricultural education. Their findings point to a stronger educator concern for resource/environmental issues — toxins, water, soils — rather than for commodity and production issues. They also found that teachers and administrators thought agricultural literacy to be an important part of education.

During the past decade USDA, Farm Bureau Federation, and the farm industry have collaborated to produce state programs titled "Ag in the Classroom" as a means of educating children about agriculture. The early curricula often stressed commodity and farm animal identification, production practices and tools, and product consumer information. Today, science, envron-

"Farming is the process of manipulating the environment to increase concentrations of human foods and fibers."

ment, and historical concepts are beginning to be included in new curriculum development projects such as "Food, Land and People".

Science literacy is recognized by educators and public as an area of national concern and priority. Some educators point to agriculture and natural resources as subject matter for new agri-science programs. The focus is on science processes utilizing curriculum such as "Fast Plants" and "Bottle Biology".

There are also an increasing number of environmental educators utilizing agricultural environments for examining ecological relationships and environmental change (Jorgensen, 1989). Agricultural practices illustrate ecological principles and reflect conservation practices (and their breakdown) in vocabulary and food security terms (famine or social well being) with which urban audiences identify. Agroecology moves one step further in seeking sustainable production systems modeled on ecological understanding. Everything (air, water, energy) is hitched together. Mulching, cover crops, companion planting, and so forth, are practices reflecting our understanding of ecological relationships.

Ag literacy, agri-science and agroecology programs all lend themselves to a thematic instructional approach integrating environmental knowledge into existing school academic subjects without further overcrowding of required instruction. Farm settings provide the laboratory experience helping people bridge their urban divorce from the environment.

References

National Research Council, National Academy of Sciences, "Understanding Agriculture: New Directions For Education". *Washington, D.C.*, 1988.

Jorgensen, Eric "Teaching Farms and Environmental Education". Eds. Gross, M. P., Wilke, R. J. and J. F. Passineau, *Working Together To Educate About the Environment,1989 Joint Conference Proceedings.* North American Association For Environmental Education, Troy, Ohio.

Rilla, Ellie R., et al "Agricultural Literacy Education in California Schools". Agricultural Issues Center, University of California, Davis, 1990.

UNIQUE FARM PROGRAMS

During the spring and summer of 1992, I had the opportunity to visit numerous farm education sites. All looked beautiful. Many had activity stations and exhibits. Some had outstanding ideas which could enrich any farm science program. The following are a few such sites which successfully demonstrate outstanding educational processes of value to other farm center programs.

ANIMAL SCIENCES

Elkus Youth Ranch, Half Moon Bay, California.
The flock of 35 Suffolk sheep provides a hands-on science laboratory for fourth grade and older children. Lambing is timed to the school year and takes place in January-February where large barns protect participants from the elements. Lambing pens allow easy observation, participation in feeding and cleaning, and assistance with all the tasks associated with birth — dipping umbilical cords, weighting, tagging, record keeping, etc. Mammals, birthing, bonding and parenting are discussed. As the lambs grow, children assist with docking and castration (elastrators), vaccinations, worming, marketing and breed stock selection. (Ewe record cards provide data for role playing.) Husbandry tasks lend themselves to discussion of food chains, nutrition, nutrient and energy conversion, health and medicine, genetics, wild/domestic, predation, pasture management and so forth.

Key management ingredients: well organized gates, pens and cutting chute for easy, safe handling; and the use of color markers to code animals. The process of worming 60 lambs is spread over daily labs for 3 weeks. At Elkus Youth Ranch, lambs and ewes are an integral part of environmental education.

Lakefarm Park, Kirtland, Ohio. The Farmpark moves beyond museum and living history to show how "choices and processes involved in production affect our environment and culture." The thrust is an ecological and environmental approach to understanding plants, animals and agricultural systems.

A grade "A" dairy facility provides milking demonstrations several times a day. The demonstration moves beyond the process of modern milk production to illustrate hand milking and milking of a variety of mammals — cows, goats and sheep — thus giving the audience a world view of human / animal relationships. Combine this with information on feeds and conversion, animal evolution, environments and farming systems, and the public begins to see how how environments effect people's farming practices. This innovative site relates the distant past to recent and future practices. Farmpark is planning new animal science and machine science centers.

ONE MEASURE OF A PROGRAM'S SUCCESS—

DO THE FARM MANAGERS AND EDUCATIONAL STAFF HAVE THE SAME GOALS?

Drumlin Farm Education Center, Lincoln, Massachusetts The farm site is unique from other educational farms in its publicity and sale of farm products including lamb, eggs, chicken, potatoes and garden produce. This emphasis on "farms are for food" insures a public reality check as opposed to many zoo-like settings.

The poultry barn is a uniquely organized educational facility where new chicks are both hatched and purchased each month. Children feed poultry as well as candle, grade and package eggs, and maintain production records. Fertile eggs are dissected to examine the embryo and yoke. The variety of birds and the monthly receipt of new chicks ensures continued production and educational activity.

PLANT SCIENCES

Rodale Institute Research Station, The New Farm, Kutztown, Pennsylvania. A demonstration garden illustrates rotations, beneficial insects, trap crops, lawn care mowing trials, and a compost system. The orchard has a ground cover survey and legume screening trials. Various cover crops are being investigated in vegetable production. Agronomy trials on crops focus on soil fertility, weed control and reduction of tillage operations. Apple orchard management focuses on disease resistant cultivars, insect trapping, matting disruption and beneficial insect attraction. Farm system conversion experiments include overseeding of new crops, relay cropping techniques, and low-input reduced-tillage experiments.

The experiments and applied research are well exhibited in the field, illustrated in a guide book and expanded upon through docent tours. The New Farm will inspire educational farms to demonstrate new methods and develop plant science displays communicating environmental understanding

Claggett Farm, Chesapeake Bay Foundation, Upper Marlboro, Maryland. The 283 acre Claggett Farm focuses on agricultural production practices and their impacts upon the waters of Chesapeake Bay. The farm has a large scale erosion control demonstration project using 4' x 15' beds, on a slight incline, with various crops and tillage practices to demonstrate erosion. The beds illustrate filter strips, contour farming, strip-cropping, cover crops, waterways, and various tillage practices. Water is captured in 5 gallon jugs at the bottom to compare run-off. The water cycle impact of chemical fertilizer is illustrated through irrigation with dyed water and run-off collection.

Soil pits on farm hillsides, bottomlands and forest growth compare soil depths. Percolation cans are used for tests and plot comparisons. Students gather data from erosion plots and percolation sites; participate in tree planting; sample creek indicator species; and restore creeks and streams. Chesapeake Bay is examined through sampling of indicator species, water and plankton to understand the consquences of agricultural run-off.

Teaching farms could benefit from increased visual displays of farm conservation techniques and consequences. Manipulative, participatory, learning stations help audiences experience concepts such as "trap" plants, "beneficial" insects, soil erosion and fertilizer run-off. Claggett Farm has implemented some excellent, hands-on learning stations.

Stony Kill Farm Environmental Center, Wappinger, New York. Forestry in New York State is under urban attack. Two, five and ten acre home sites are considered "open space". Large parcels are being divided under pressure of taxes and people's desire for "God's little acre". How does society plan for the protection of larger tracts of forest to provide sustained yields of wood products? How do individuals manage the tracts of land they currently manage to sustain the productive qualities of the land?

Guided by Senior Forester John Gibbs, three one-acre demonstration forestry plots were identified and harvested. The problem: "What management strategies are best for enhancing wildlife and for growing forest products?" The control plot is a mix of maple, beech, hickory, white ash, and red and white oaks. A seed tree plot was largely clear cut, but left a few of the best seed species plus some snags were left. A shelter woods plot used shade as a control consideration along with seed sources. A clear cut plot was the final acre. (In the clear cut, grasses were already beginning to cover various patches of earth and inhibit tree seed reproduction.) Each of the cut plots has a 10' x 10' fenced enclosure protecting seedlings from an over abundant deer population.

John Gibbs is developing curriculum strategies for schools and public. The curriculum will help the forest owner educate the public on land use planning issues and provide hands-on activities for children learning science. Ideas include use of hula-hoops for random seed germination counts and selective thinning activities. Exciting opportunities are being developed at Stoney Kill to provide forestry education.

MULTICULTURAL EDUCATION

Sunrock Farms, Wilder, Kentucky. This 63 acre teaching farm outside of Cincinnati, Ohio has goats, cows, pigs, wheat, corn, and forested hillsides. Twenty part-time staff share farm and stewardship practices with 30,000 children each year. Along with programs focused on conservation and ecology, Sunrock has developed a "A Multicultural Farm Experience". The premise: an American farm raises animals and plants with origins from numerous places in the world. Teachers select one or more cultural themes — African, Asian, European and Native American. Each theme covers four areas: plant and animal foods historically from the region; pottery and weaving traditions of the region's cultures; traditional dwellings of the region; and the origins of agriculture in the region. Drumming, storytelling and games help weave together a day focused on the origins, interrelationships, and migration of agriculture and peoples. Informed citizenry must understand the links between farming practice and national policy and culture.

EDUCATIONAL RESOURCES

This section describes curricula, journals and organizations which provide diverse insights into agricultural and environmental relationships. The section does not review materials of common use such as "Project Learning Tree" or "Project Wild". Instead, the focus is on new curricula emphasizing a hands-on, experimental approach using science processes. The journals are sources of information expanding our perceptions of issues and solutions. The organizations listed have a common thread in education, but represent diverse agricultural perspectives and ideas.

AGRICULTURE: INCORPORATING ENVIRONMENTAL AND SOCIAL COSTS
(A BOOK REVIEW)

(Paul Faeth (et al) Paying the Farm Bill: US. Agricultural Policy and the Transition to Sustainable Agriculture, Report of the World Resources Institute, Washington, DC., March 1991.)

The diverse institutions represented by the authors (World Resources Institute, Rodale Research Center, Dept. of Agricultural Economics at Purdue University and Agricultural Economics at University of Nebraska) invite one to examine this book carefully.

The authors look at farm profits under various farm management practices and policy scenarios on a Nebraska and a Pennsylvania farm. The authors include natural resource costs in their economic comparisons of conventional and alternative production systems. For example, soil loss and fertilizer inputs are calculated and compared on a corn-soybean rotation vs. a corn-grain-pasture-soybean rotation. This included the public costs of each practice for removing soil from waterways and ditches.

The study generates two important sets of findings: one concerning farm production systems and the other concerning national farm policy options. Adoption of resource-conserving, production practices are economically feasible with substantial environmental benefits. However, current farm policy financially inhibits resource-conserving practices.

This is an important book with plenty of farm education ideas for interpretation, exhibits, workshops and educational instruction. Farm education centers can demonstrate and interpret alternative production practices and exhibit resource impacts. Informed citzenry should also understand the links between farming practice and national policy.

CURRICULUM

Toward a Sustainable Agriculture: A Teacher's Guide.

A high school curriculum guide emphasizing systems thinking—acknowledging and exploring connections. Background chapters include "Sustainable Cropping and Livestock Systems", "The Economics of Sustainable Agriculture", "Alternative Agricultural Enterprises", "Public Policy Choices in Sustainable Agriculture" and "Ethics and Agriculture: Can Agriculture be Good?". Each background chapter raises ideas that effect agricultural decision making.

The next section of the Guide is a model curriculum outline arranged to guide classes through a scientific, socio-political and philosophical investigation of sustainable agriculture. A final section outlines twenty-one activities to foster critical thinking and hands-on interest. The Guide is an important step in tackling environmental awareness and sustainablility issues.

Fast Plants Curriculum

Fast Plants provide an exciting resource for teaching plant science in classrooms from preschool through college. The plants, a variety of Brassica rapa, have a very short life cycle, respond rapidly to environmental stimuli, can be easily hand pollinated, and grow and reproduce at high densities. The plants provide an inexpensive way to teach plant growth, reproduction, genetics and ecology.

Source: Robin Greenler, 1630 Linden Drive, University of Wisconsin, Madison, WI 93704. (608) 263-5654 or Carolina Biological Supply Company, Burlington, North Carolina 27215. (800) 547-1733.

Bottle Biology Curriculum

Hands-on science curriculum using plastic beverage bottles and throwaway containers provides inexpensive ways to create life science experiments for studying a variety of biological principles and agricultural applications. Experiments can explore population dynamics, land-water interactions, physiology, and community ecology. The curriculum is targeted at junior and senior high school students.

Source: Bottle Biology Program, University of Wisconsin-Madison, 1630 Linden Dr., Madison, WI 53706, (608) 263-5645

The Growing Classroom

This nationally field-tested elementary curriculum integrates gardening activities with science, nutrition and environ-

BEST COPY AVAILABLE

ment. Activities are clearly organized by grade and subject areas and focused around the use of gardens as a laboratory of experience, inquiry and discovery. Concepts of ecology and science are clearly presented. This is an excellent curriculum which avoids the "how to" of gardening and focuses on the "learning through" of the gardening experience.

Life Lab Science Program offers regional and national workshops for teachers and educators. They produce "The "Growing Teacher" newsletter.
Source: Life Lab Science Program, 1156 High St., Santa Cruz, CA 95064. (408) 459-2001.

Life Lab Science

"Life Lab Science" was developed in a collaborative effort between the Life Lab Program, the National Science Foundation and Videodiscovery, Inc. The K-3 curriculum includes: a Teacher's Resource Book for each grade level and a videodisc with graphics and photos showing cycles, concepts and gardening methods. Topics are cross referenced to manual units. A Science Discovery Kit, a Garden Reference Book, a Garden Log calendar, student Lab Books and a Guess-Test-Tell-Poster are all part of the program. Grades 4-6 will be published in the near future.
Source: For the K-3rd curriculum call Videodiscovery at (800) 548-3472 or write Videodiscovery, 1700 Westlake Ave. N. suite 600, Seattle, WA 98109.

Food for Thought: Agricultural Classroom Activities for Growing Minds

"Food For Thought" is based on the premise that agricultural literacy is an important element of a complete education and should be woven into science and social studies on the elementary level using local agriculture as subject matter. The 3-6 grade activity guide is divided into four sections with 29 activities: "Discovering Agriculture", "Exploring the Historical and Cultural Diversity of Agriculture", "Understanding the Management and Economics of Agriculture", and "Relating Agriculture and the Environment". Based on Marin County, California's agricultural history, peoples, and environmental problems, the book is a successful thematic approach to integrating agricultural subject matter into all academic subjects. The guide is an excellent model for agricultural literacy. Write for a disk.
Source: University of California Cooperative Extension, 1682 Novato Boulevard, Suite 150B, Novato, CA 94947. (415) 899-8620.

Investigating Ecology

Science is active, hands-on learning including careful investigation through scientific projects and experiments. Investigating Ecology provides brief background and instruction for numerous projects in chapters on "human ecology", "environmental factors", "cycles and energy", "territory and balance", and "communities". All the projects are very adaptable to farm settings. Examples: "Some food preferences of insects", "How is an animal's increase in mass related to the mass of food it eats?" and "Estimating the population of Spittlebugs in a field."

An excellent and often overlooked source book for developing agri-science activities for 7-12 grade students.
Source: *Investigating Ecology*, by Blaustein Elliot and Rose Blaustein. Arco Publishing Co., NY, NY, 1978.

MAGAZINES AND JOURNALS

High Country News
P.O. Box 1090
Paonia, CO 81428

Focuses on the social science aspects of plain and western state agriculture, mining, forestry, water and related environmental issues. Reports on the politics and conflicts surrounding resource development and management. A crisp, insightful newspaper illustrating use of science to support public policy issue alternatives.

The New Farm
P.O. Box 14
Emmaus, PA 18099-0014

A magazine of sustainable farming practices published by Rodale Press. It contains ideas for improving farm site management practices and ways for communicating concepts to the public.

Ecological Economics
International Society for Ecological Economics
P.O. Box 1589
Solomons, MD 20688

Society publishes journal and newsletter of research and ideas on establishing economic tools providing environmental accountability.

Journal of Pesticide Reform
P.O. Box 1393
Eugene, OR 97440

Research, education, political analysis and opinion on pesticides.

Small Town Institute
P.O. Box 517
3rd Ave and Popular St
Ellenburg, WA 98926

Newsletter of new and innovative ideas concerning issues and problems facing small towns. Provides insights into agriculture, rural lands, community relationships and sustainablility issues.

ORGANIZATIONS

National Council On Agricultural Education
5632 Mount Vernon Memorial Highway
P.O.B. 15035
Alexandria, VI 22309-0035
(703) 360-8832

An umbrella organization supporting Future Farmers of America, the National Vocational Agriculture Teachers Association and related organizations. Supports curriculum development and professional training.

ALHFAM
Route 14, Box 214
Santa Fe, NM 87505

The Association for Living Historical Farms and Agricultural Museums. Members focus primarily upon interpretation of food, production and life styles in historic, agricultural settings.

NAAEE
P.O. Box 400
Troy, OH 45373
(513) 676-2514

North American Association of Environmental Education is a professional society with four sections: environmental studies, conservation education, elementary and secondary education, and non-formal education. The Association provides a newsletter, professional journal, conference proceedings, monographs and holds an annual conference.

National Federation of City Farms
Avon Environmental Centre
Unit 6, Junction Road
Brislington, Bristol B543jp
England

A federation of educational farms located in urban settings in various parts of Europe.

Delta Society
P.O. Box 1080
Renton, WA 98057
(206) 226-7357

International and national educational programs and conferences on the interactions of people, animals, and the environment. Quarterly magazine and journal.

Alternative Farming Systems
National Agricultural Library
USDA
10301 Baltimore Boulevard, AFSIC, Rm 111,
Beltville, MD, 20705-2351

Library maintains file of educational programs, research centers and training opportunities in sustainable agriculture.

A DIRECTORY OF ENVIRONMENAL EDUCATION SITES FOCUSING ON AGRICULTURE

The directory lists farm centers utilizing agriculture as a focus for environmental education. It's purpose: to facilate increased sharing of exemplary ideas, resources and practices. The list, though far from complete, begins the process of providing information on sites (farms, parks, museums) which are integrating environmental education with agriculture in their program settings. The directory includes a few schools with unique attributes and programs useful to environmental educators, but does not attempt to identify a growing list of schools which have developed model programs integrating agriculture, science and environment as a themematic approach to high school course work. There are also a few historical farms which integrate some environmental understanding into their programs.

The descriptions are based on visits, site literature and occasional phone conversations. They are not intended to be a complete description of site resources and programs. Any errors are the oversite of the author. The descriptions are intended to encourage contact and communication amongst sites thus increasing the quality of environmental education and agricultural understanding.

Organization	Agricultural Institute-Anderson Valley High School		
Contact	Steve McKay, Director		
Mailing Street	P.O. Box 130 13630 Mt. View Rd.		
City/State/Zip	Boonville	CA	95415
Phone	(707) 895-3496		
Description			

The program combines core agriculture curricula, specialized study and experimentation using advanced technology, and individual work projects. Teachers plan together on cross-curricular integration of instruction (math, science, english, social studies, business, art) focused around agriculture. The program appeals to diverse student interests ...technology and science, food processing, business, design and packaging, marketing, and sales. The site has science labs, greenhouses, orchard, aviary, gardens and livestock. International contact with sister cities helps students study resources, cultures and products of the world's agricultural community. High-tech horticulture training, use of computers for energy conservation, cloning tomatoes from shoot-tip culture in a sterile plant tissue culture lab, researching and experimenting on new gooseberry varieties ...a program involving students in diverse science processes.

Organization	Agriscience Institute And Outreach Program - ABS DEPT.		
Contact	Dr. Linda Whent		
Mailing Street	University of California		
City/State/Zip	Davis	CA	95616
Phone	(916) 752-1802		
Description			

Supported by the W. K. Kellogg Foundation and the National Council On Agricultural Education, the project is a joint program between the University of California, Davis and the University of Wisconsin, Madison. Linda Whent serves as Program Outreach Director and Robin Greenler, University of Wisconsin, is Institute Director. The project's primary purpose is to integrate the teaching of agriculture and science in both high school ag and science classrooms. Teacher institutes in 1991 and 1992 brought together 10 teams of science and agriculture education teachers. They collaborated with university educators on developing model, hands-on laboratories for their students reflective of current agricultural research efforts and scientific developments. The materials were tested in school classrooms, revised, and packaged for dissemination to ag and science teachers across the nation. The materials use Wisconsin's Fast Plants and Bottle Biology to emphasize a problem solving approach to learning. Students design and conduct their own experiments. Training institutes are available in various

Organization	Agroecology Program		
Contact	Stephen Gliessman, Director		
Mailing Street	University of California		
City/State/Zip	Santa Cruz	CA	95046
Phone	(408) 459-4140		

Description

The program examines long-term research issues of sustainable, ecological agriculture. Besides graduate and undergraduate studies, a six month residential apprenticeship training program is available. Instruction focuses on organic horticulture and stresses ecological interrelationships between plants, soils, climate, insects and pathogens. The program also offers workshops and docent led tours of the 25 acre organic garden. "The Cultivar" newsletter reports on research, program activities and agricultural topics.

Organization	Ardenwood Historic Farm		
Contact	East Bay Regional Parks		
Mailing Street	34600 Ardenwood Boulevard		
City/State/Zip	Fremont	CA	94555
Phone	(510) 796-0199		

Description

A 205 acre living history farm re-created of a late 19th century farm family. Programs encourage visitor participation in turn-of-the-century farm activities. General agriculture, livestock, and organic gardening are all part of the setting. The farm's popularity has necessitated a lottery system to select visitors.

Teacher guides are available and include classroom activities. The focus is upon farm arts and history.

Organization	Aullwood Audubon Center and Farm		
Contact	Christy Krueger		
Mailing Street	1000 Aullwood Rd		
City/State/Zip	Dayton	Ohio	45414
Phone	(513) 890-7360		

Description

A 200 acre nature education and agricultural studies center. The farm has livestock, gardens, and field crops along with pond, woodlands and prairie. The center operates a docent program, adult education programs, school and youth programs, tours, camps, a library and a bookstore. The focus is on farm arts, ecology and wildlife.

Organization	California Foundation For Ag in the Classroom		
Contact	Mark Linder, Executive Director		
Mailing Street	1601 Exposition Boulevard		
City/State/Zip	Sacramento	CA	95815
Phone	(916) 924-4380		
Description			

The foundation offers an "Agricultural Institute" teacher training program each summer, educational materials on agriculture, and a curriculum titled "Science and Agriculture" (a series of 13 classroom units). "Cream of the Crop", a newsletter for educators, offers program and curriculum ideas. The foundation has a video tape library. Founded by the California Farm Bureau, the foundation promotes educational materials and information about California agriculture and commodity groups to educate children about the importance of agriculture.

Organization	Claggett Farm-Chesapeake Bay Foundation		
Contact	Michael Heller, Manager		
Mailing Street	11904 Old Marlboro Pike		
City/State/Zip	Upper Marlboro	MD	20772
Phone	(301) 627-4393		
Description			

The 283 acre Claggett Farm focuses on the relationship between agricultural practices and the waters of Chesapeake Bay. Alternative farming practices are researched and impacts of pesticides and fertilizers on ground water, stream, marsh and Bay are closely monitored. These investigations are conveyed to students and public through an environmental education program.

Students gather data from erosion plots and percolation sites, participate in tree planting, sample creek indicator species, improve waterways, and take water and plankton samples on Chesapeake Bay. The course of study focuses on the farm the first day, on creeks, streams and urban development during day two, and on the Bay and estuaries during day three.

Organization	Deer Hollow Farm		
Contact	Mary Gilmore, Coordinator		
Mailing Street	7550 St. Joseph Ave.		
City/State/Zip	Los Altos	CA	94024
Phone	(415) 968-0364		
Description			

Located on Mid Peninsula Regional Open Space District land, the farm is an educational center for school classes and public. Ecology and environmental understanding are woven into farm and wilderness themes. The 10 acre farm offers hands-on programs emphasizing animal care, gardening, Native Americans, pioneer arts, native plants, and wilderness exploration. A well organized docent program enables small pupil/docent field ratios.

Organization	Drumlin Farm -- Massachusetts Audubon Society		
Contact	Susan Rauchwerk		
Mailing Street	South Great Road		
City/State/Zip	Lincoln	MA	01773
Phone	(617) 259-9500		
Description			

The farm and sanctuary serve school classes, after school programs, adult classes, weekend outings and holiday camps. In addition, an "Ark" program visits schools and youth centers. Purpose: "the preservation of an environment that supports both humans and wildlife." The Center has 37 hourly staff, numerous volunteers and a core professional staff. The Center has a strong commitment to curriculum and training, and offering courses to teachers, volunteers and the community.

The farm is unique for its sale of farm products: lamb, eggs, chickens, potatoes and garden produce. This emphasis on "farms are for food" insures a public reality check as opposed to many zoo-like farms. The poultry barn is a uniquely organized facility where chicks are hatched regularly, and new varieties of pullets arrive each month. Children feed, gather eggs, and sort, candle, grade and package eggs.

The farm has developed units on "Energy", "Soils", "Endangered Species" and "Wild/Domestic" along with a good volunteer orientation manual.

Organization	East High School Ag Science Program		
Contact	Gary Maricle, Principal		
Mailing Street	1924 Van Brunt Blvd.		
City/State/Zip	Kansas City	MI	64127
Phone	(816) 871-1800		
Description			

Upon entering the school, fish tanks, terrariums, field trip photos, recycling containers and magazines such as *Garbage, National Geographic,* and *National Wildlife* establish a unique atmosphere in halls, offices and classrooms. The image is one of serious science education and pride. Two curriculum tracks have been developed with extensive faculty training and planning. The environmental science goals focus on knowledge, citizenship, appreciation, responsibility, science skills and careers. The agri-business objectives include preparation for an agri-business career, knowledge of the industry and personal development.

The two pathways are struggling to find common philosophical direction. The agri-business program, rooted in vocational agricultural traditions, is under developed in science and environment components. The school's 18 acres of grounds and a 100 acre farm/wildlife site will sharpen the philosophical discussion as the two program tracks seek common ground for education projects and resource management.

Organization	Elkus 4-H Ranch - University of California Cooperative Extension		
Contact	Joyce James		
Mailing Street	625 Miramontes St., Suite 200		
City/State/Zip	Half Moon Bay	CA	94019
Phone	(415) 726-9059		
Description			

A 530 acre ranch with large barns, diverse livestock, greenhouse, garden, pasture lands and wildlands. Site provides life science programs for schools, farm camps, 4-H clubs and other youth agencies.

Of note are the animal science opportunities and use of a 30 ewe flock. Lambing is timed to the school year allowing the livestock barn to serve as a science lab: birthing, docking, castration, vaccinations, worming, marketing, culling, genetic improvement decisions, and feeding are all hands-on activities. Topics of lab discussion: food chains, parasites, mammals, birthing, genetics, wild vs. domestic, nutrition, and marketing.

A green house and lath shed support a plant science program which includes making decomposable planting pots from recycled newsprint. A typical day's experience involves children in all elements of plant care: planting seeds, transplanting, weeding, watering, and harvesting.

Organization	Farm and Wilderness Camps		
Contact	Jeanette Malone, Dir. of Outdoor Education		
Mailing Street	HCR 70, Box 70		
City/State/Zip	Plymouth	VT	05056
Phone	(802) 422-4403		
Description			

Environmental awareness, earth stewardship, farming, gardening, farm arts, community building and ropes course initiatives are woven into backpack trips, summer camps and school programs. The hands-on program emphasizes personal responsibility, caring and community.

Organization	Farm Center, Huron-Clinton Metro. Authority		
Contact	Debbie Cavallago, Farm Manage		
Mailing Street	2240 W. Bruno Road		
City/State/Zip	Milford	MI	48042
Phone	(313) 685-1561		
Description			

The 100 acre farm's focus is upon interpretation of human food production. Located near the Detroit metropolitan area, the farm has 400,000 visitors each year. The center produces a variety of demonstration crops and houses a several varieties of cattle, dairy cows, sheep, goats and hogs along with small animals. The goal: to provide urban dwellers with an opportunity to appreciate the sights, sounds and smells of farm life.

Programs focus on k-3 school grades and weekend family programs. Family programs and festivals provide public participants with opportunities for making cider and butter, grinding grains, forming candles, and other farm arts.

Organization	Food Works		
Contact			
Mailing Street	64 Main St		
City/State/Zip	Montpelier	VT	05602
Phone	(802) 223-1515		
Description			

A team of curriculum writers have integrated food, community and ecology into interdisciplinary K-6 curriculum titled "Common Roots". The curriculum has been pilot tested at school sites.

Organization	Gifford Farm - Project Plum		
Contact	Randy Gleason		
Mailing Street	700 Camp Gifford Road		
City/State/Zip	Bellevue	NE	68005
Phone	(402) 292-4100		
Description			

An agriculture and conservation education program exposing urban children to ag and food production. Located on an ox-bow of the Missouri River, the 400 acre farm is surrounded by woodlands. Programs titled "Farm Tours", "Food from the Land to You", "Woodland Tours", "River Tours", "Wildlife of the Farm", and "Soils Program" are offered to 15,000 annual K-12 visitors. Curriculum guides are available.

Organization	Good Earth Association		
Contact	Donald L. Waterworth		
Mailing Street	202 East Church		
City/State/Zip	Pocahontas	AR	72455-2899
Phone	(501) 892-9545		
Description			

Organized to operate equipment and lands for the purpose of: researching new methods, improving the effectiveness of small farms, assisting small scale technology, and helping self sustaining family farming. The association teachs farm skills including sorghum making, candle and soap making, horse farming operations and saving seed. The association operates the Living Farm Museum of the Ozarks, Save our Seeds and other projects.

Organization	Green Chimney Farm		
Contact	Dr. Ross, Director		
Mailing Street	Box 719, Putnam Lake Road		
City/State/Zip	Brewster	NY	10509
Phone	(914) 279-2995		
Description			

The goal: to ..."restore troubled children back into their families and society. The animals are a catalyst and make this possible. They encourage the children to relate more successfully to the staff, each other and most importantly, to themselves."

Located on farm and forest lands, the center offers year-round programs for 102 student residents along with public programs for the community. Programs include the Hillside Outdoor Education Center, summer camps, farm and wildlife center activities, farm tours, an agricultural literacy program for 2nd-5th grades, a minor breeds program for 3rd-5th grades, horseback riding lessons, a ropes course, and "Farm on the MOO-VE" (taking the farm to urban schools). Wherever possible, the resident youth learn leadership and communication skills by providing leadership in public programs.

A newsletter and publications are available on the interactions of youth and animals including "Plants, Pets and People" and "Some Thoughts on Children and Animals."

Organization	Hard Bargain Farm Environmental Center		
Contact	Kay Powell, Director		
Mailing Street	2001 Bryan Point Rd		
City/State/Zip	Accokeek	MD	20607
Phone	(301) 292-5665		
Description			

The 330 acre demonstration farm borders the Potomac River across from Mount Vernon and serves youth from Prince George and Charles Counties. Goal: "uniting our most valuable resources: children and the environment". The 10,000 program participants are led by paid staff in groups of 8-10 youth. Finances come from contracts with county schools, the Maryland State Department of Education and the National Park Service along with Foundation funds. The curriculum is aligned with state environmental education guidelines.

The environmental programs are tied to river, swamp, forest and farm. Ecological principles and land stewardship are woven into all areas. The center offer an annual teacher course titled "Geography and Biology of the Potomac River". A curriculum piece titled "Who Dirtied the Water" has been particularly successful.

Organization	Hidden Villa Environmental Education Project		
Contact	Trust for Hidden Villa		
Mailing Street	26870 Moody Road		
City/State/Zip	Los Altos Hills	CA	94022
Phone	(415) 9484690		
Description			

An 1800 acre wilderness area with a 60 acre farm. Farm tours, environmental educational programs, camps and teacher training programs are offered. A large docent and internship program help maintain small group learning ratios. Programs focus on ecology, land stewardship and sustainable living practices. A large variety of farm animals, orchard and gardens are used at this historic "gentleman's farm" turned environmental education center.

A curriculum guide "Manure, Meadows and Milkshakes", an audio cassette of ecology songs titled "Hug the Earth", and a docent training manual are available.

Organization	Kalamazoo Nature Center -- Human Environments Program		
Contact	Steven W. Lord, Human Environments Coordinator		
Mailing Street	7000 N. Westnedge 555 West E. Ave.		
City/State/Zip	Kalamazoo	MI	49004
Phone	(616) 381-1574		
Description			

The Human Environments Programs interprets the interaction between humans and their environments in various historical settings -- a Potawatomi Village, a Pioneer Pitch and the DeLano Homestead. The units are sequential, experientially-based lessons for first through sixth grades and focus on ecological understanding, human skills, and attitudes for stewardship. A lead teacher and one or two volunteers utilize a historical setting to instruct the concepts of I CARE (Inter-connections, Community, Adaptation, Recycling, and Energy-flow). The center has docent programs, adult education programs, youth tours and classes, meeting facilities, library and bookstore.

Organization	Kalamazoo Nature Center -- Spring Comes to the Barnyard		
Contact	David Hale		
Mailing Street	7000 N. Westnedge 48606 C.R. 673 Lawrence, MI 49064		
City/State/Zip	Kalamazoo	MI	49004
Phone	(616) 381-1574		
Description			

Goals: to help preschool through first grade children better understand the roles of animals and people and their relationships within our ecological system; and to help children learn respectful treatment of living things. Groups do barn activities, take a tractor wagon ride and tour the animal pens. The focus is on the relationships between humans, animals, farm crops and the food cycle. The center has docent programs, adult education programs, youth tours and classes, meeting facilities, library and bookstore. The center has docent programs, adult education programs, youth tours and classes, meeting facilities, a library and a bookstore.

Organization	Kellogg Biological Station		
Contact			
Mailing Street	Hwy 20 - Box 182		
City/State/Zip	Hickory Corners	MI	49060
Phone	(616) 671-2508		
Description			

A research and education center encompassing 2300 acres including forest, Dairy Center, Bird Sanctuary, Gull Lake laboratories, Farming Systems Center, Cooperative Extension and a conference complex. KBS conducts long term ecological research. The Station conducts adult and youth educational programs as well as public tours.

Organization	Lake Farmpark -- Lake Metroparks		
Contact	Darwin Kesey, Director		
Mailing Street	8800 Euclid-Chardon Rd.		
City/State/Zip	Kirtland,	OH	44094
Phone	(216) 256-2122		
Description			

Farmpark moves beyond museum and living history to show how "choices and processes involved in production affect our environment and culture." The focus is thematic -- energy, endangered species, breeds and genetics, etc. The thrust is an ecological and environmental approach to plants, animals and agricultural systems.

The Visitor Center has a restaurant and bookstore, theater, two classrooms, and a grade "A" dairy facility with cow, goat and sheep milking demonstrations. A new Plant Science Center is near completion, and a machine technology center and animal science center are planned. Open 3 years, attendance last year was 150,000. The Farmpark utilizes 31 staff, 21 seasonal staff and 300 volunteers.

While Farmpark has field crops, orchards and animals, it is a setting for education and recreation first and farming second. Farmpark is suited to "developing scientific literacy, especially agricultural, biological and environmental literacy ...relating the distant past to recent past, present and future."

Organization	Land Institute		
Contact	Jack Vail, Acting Education Director		
Mailing Street	2440 E. Water Well Rd.		
City/State/Zip	Salina	Kansas	67401
Phone Description	(913) 823-5376		

The Institute is devoted to sustainable agriculture and land stewardship through study and research at "The Land". The goal is to protect the long term ability of the earth to support a variety of life and cultures. The premise -- the most rational agriculture for a region is one emulating the area's natural systems.

Along with research, the Institute publishes a journal titled "The Land Report", conducts an annual Prairie Festival, produces a truck farm garden, and writes an annual newsletter on grain and seed. The core of the Institute is an internship program of 8-10 post graduates from a variety of academic backgrounds. Interns work closely with the research staff, truck farm, and newsletter in addition to a course of study and research.

Future Institute projects include work on sustainable communities and "sunshine farm" (the conversion of farming operations from fossil fuel to renewable energy sources). The Institute's research and education stimulate thoughtful contemplation about the relationships between food propagation, biological communities and sustainable living.

Organization	Living History Farms		
Contact			
Mailing Street	2600 NW 111		
City/State/Zip	De Moines	IO	50322
Phone Description	(515) 278-5286		

Living History Farm is a 600 acre "open air museum" that tells the story of midwestern agricultural change. Divided into four farm eras and a 1875 frontier town, the buildings, planting methods and livestock are authentic to the time periods represented. An Ioway Indian farm site portrays village life and planting practices around 1700. The 1850's pioneer settler farm has small cultivated plots, split rail fences and a few animals reminiscent of that period of self sufficient living. The 1900's farm is bustling with house and field activities. The house and barn have goods and machines reflecting commerce and trade. The final exhibit, the Henry A. Wallace Crop Center, is a "futuristic", underground building displaying the evolution of the "miracle of corn". "Futuristic" is a poor term as the concepts of fossil fuels and cross breeding are already becoming apart of history.

Organization	Loma Vista School Farm and Garden Center		
Contact	Tom Arcadi, manager		
Mailing Street	101 Cobb Ave. 156 Ranier		
City/State/Zip	Vallejo	CA	94589
Phone	(707) 643-8420		
Description			

This 4-1/2 acre farm on the Loma Vista School site has been operating 15 years. Hydroponic greenhouse, gardens, pond, barn and animals -- all provide an interactive program for all ages. Children are actively involved in all aspects of the farm care and management. Experiences are integrated into all grade levels and subject areas with a strong emphasis on science. The school site hosts classes from schools in the district. A curriculum guide is available.

Organization	Long Branch Farm		
Contact	c/o Cincinnati Nature Center		
Mailing Street	4949 Tealtown Road		
City/State/Zip	Milford	OH	45150
Phone	(515) 831-1711		
Description			

The primary focus of this farm is teaching "agricultural ecology, a state of harmony between land and human needs." LBF has 535 acres supporting angus cattle, sheep, goats, draft horses, rabbits, pasture, gardens and wildlands. Students help with chores and investigate one lesson such as beef production, genetics, nutrition, economics and feed, or soil and water conservation. The educational program successfully integrates elementary science with agricultural concepts.

The farm is open by reservation to school classes and offers a summer day camp. Volunteers support the two staff educators and enable small educational groups. The farm has an excellent volunteer manual.

Organization	Malabar Farm State Park		
Contact	Scott Fletcher, Naturalist		
Mailing Street	4050 Bromfield Road		
City/State/Zip	Lucas	OH	44843-9745
Phone	(419) 892-2784		
Description			

Malabar is composed of 915 acres of farmland, pasture, woods, ponds and streams. Purchased by Louis Bromfield, the orignial farming practices focused on "grass farming" for pasture, forage and soil renewal. Contour plowing and use of grass strips between rows of crops to check and absorb run-off are soil conservation practices still employed today. Bromfield promoted wild birds and animals by establishing ponds with cover and feed, and replacing barbed fences with hedges of multiflora rose which formed natural barriers for livestock and habitat for wildlife. Today 280 acres are cultivated on a 5 year rotation plan and support a herd of 130 dairy cows. The farm focus is on sustainable, animal-based agriculture.

The farm is operated by the State of Ohio with tours, camping, a restaurant and youth hostel. The farm offers demonstrations, a docent program, school and youth programs, tours, a library and a bookstore.

Organization	Malachite Small Farm School		
Contact	Alan Mace		
Mailing Street			
City/State/Zip	Gardner	CO	81040
Phone Description	(719) 746-2412		

Located at 7300 ft elevation in a sparsely populated area of the Sangre de Christo mountains, this educational organization "practices and teaches sustainable ways of living and farming that are responsible to the land and community." Hay, grain and livestock are the principle products in this marginal growing climate. The small program served 400 visitors in 1991. Internships are available.

Organization	Merck Forest and Farmland Center		
Contact	Executive Director		
Mailing Street	P O. Box 86		
City/State/Zip	Rupert	VT	05768
Phone Description	(802) 394-7836		

Containing 2800 acres of forest with a 20 year management plan and a 50 acre farm, the center focuses curriculum around food and fiber management. The center operates a summer camp and residential environmental education school programs.

Organization	Misty Meadow Farm		
Contact	Fred Sepe		
Mailing Street	2828 Vineyard Rd., R.D. 2		
City/State/Zip	Romulus	NY	14541
Phone Description	(607) 869-9243		

Misty Meadow is a 150 acre family farm producing 1500 hogs per year and feed crops. Guided tours through the barns focus on modern swine production. The audience is 71% adult and 29% children. Tour questions discuss animal rights, nutrition, insecticides, management programs, and why the owner farms.

Other farm animals, a farm gift shop (fill your freezer with pork), and farm kitchen are part of the Misty Meadow experience. Open May to October.

Organization	Muscoot Farm Park		
Contact	Cynthia Grant		
Mailing Street	Rt. 100		
City/State/Zip	Katonah	NY	10536
Phone	(914) 232-7118		
Description			

The 777 acre dairy farm is managed to "preserve and interpret for the public benefit the agricultural, cultural and natural heritage of the farm..." Utilized for educational programs and park visitation, programs of livestock chores, milking, and farm arts benefit 10,000 school youth annually. In summer, a Young Farmer's camp is offered. A small docent program helps with the programs. The curriculum is tied to New York State Guidelines for social studies.

Farm practices -- feeding, gardening, haying, farrowing -- could be better integrated into the education programs. The farm needs a clear agricultural management plan integrating farm practices and educational programs. Current staffing is heavily skewed toward grounds and maintenance (6) with only the program director and volunteers for interpretation. The site hold great potential for increased environmental education activity.

Organization	National Colonial Farm - Piscataway Park		
Contact	Charles Kauffman		
Mailing Street	3400 Bryan Point Rd.		
City/State/Zip	Accokeek	MD	20607
Phone	(301) 283-2113		
Description			

Goal: to "preserve, protect and foster charitable, scientific and educational uses ...of the Maryland shore of the historic Potomac River." The Foundation pursues land use protection goals as well as environmental, agricultural and historical programs of public education. The Foundation has replicated an 18th century farm of colonial origin and a new farm titled "Ecosystem Farm" is providing an explanation of 21st century farming practices.

Ecosystem Farm's goal is to demonstrate ecologically-sensitive farming practices for maximum production on a parcel of Foundation land. Aspects for interpretation: a water and soil conservation plans, soil improvement practices, pest control measures not relying on pesticides and encouraging beneficial insects, and a buffer of perennial crops between the river and fields. Ecosystem Farm is challenged to discover and implement insightful ways for helping youth and adults understand the ecological fabric of the land, farming problems and ecological solutions.

Organization	Natural Resources Trust of Eaton Massachusetts		
Contact	Gary Van Wart, Exec. Director		
Mailing Street	P.O. Box 187		
City/State/Zip	South Easton	MA	02375
Phone	(508) 238-6049		
Description			

Small model farm and environmental education programs on 100 acre estate. The programs are tied to South Eaton School District.

Organization	New Pond Education Center		
Contact	Ann Taylor, Director		
Mailing Street	101 Marchant Road		
City/State/Zip	West Redding	CT	06896
Phone	(203) 938-2117		
Description			

Located on 100 acres of private forest, ponds, and fields, the New Pond Foundation conducts programs to "promote understanding and appreciation of the natural world." Science, natural history and farm programs -- sugaring, apple pressing, pond study, Native Americans, farming, astronomy, etc. -- for school children, after school "explorer" groups, and weekend and evening family groups are led by paid staff naturalists.

Organization	Oak Ridge Farm - Milwaukee Public Schools		
Contact	Anthony Weber		
Mailing Street	35961 Hwy. C		
City/State/Zip	Dousman	WI	53118
Phone	(414) 965-3220		
Description			

A 200 acre operating demonstration farm teaching Milwaukee area youth about farm animals and crops -- especially the supply of food and fiber. The farm serves 15,000 people annually, primarily preschool thru 4th grades. The farm has 15-20 part-time tour guides and a farm manager. The farm is located in a state forest. Management practices are guided by a conservation plan, utilize a diversified cropping system and focus on improving sustainable agricultural practices. Programs focus on food and fiber conversion and farm arts activities.

Organization	Old Borges Ranch		
Contact	Marnie White, Program Coordinator		
Mailing Street	1035 Castle Rock Road		
City/State/Zip	Walnut Creek	CA	94598
Phone	(510) 934-6990		
Description			

Interpretative and living history programs for schools and groups. Barns, wagon sheds, blacksmith shop and other out buildings are located on 2,500 acres of range land. The ranch has cattle, sheep, pigs, horses and small animals. Day and overnight programs utilize displays, demonstrations, and hands-on projects.

Organization	Old Mill Farm and School of County Living		
Contact	Chuck Hinsch, Director		
Mailing Street	P.O. Box 463		
City/State/Zip	Mendocino	CA	95460
Phone	(707) 937-0244		
Description			

The small scale diversified organic farm includes market garden, permaculture, edible landscaping, animal husbandry operations (dairy goats and cheese, sheep and colored fiber), and a sustainable timber operation. The 320 area homestead utilizes alternative energy for all living and operational needs. The educational focus is on self sufficient food production. Environmental education programs available by reservation.

Organization	Oliver H. Kelley Farm		
Contact	James Mattson, Director		
Mailing Street	15788 Kelley Farm Rd.		
City/State/Zip	Elk River	MN	55330
Phone	(612) 441-6896		
Description			

An interpretative program of the mid-late 1800's farm life style, including a restored prairie, on 190 acres. The farm offers youth programs and has a library and bookstore. "The Kelley Farm Activity Book" is 32 pages coloring book for grades 1-3 and 4-6. It contains illustrations and text that depict American farm life 125 years ago.

Organization	Oxon Hill Farm-National Capital Parks East		
Contact	Jim Rosenstock		
Mailing Street	1900 Anacostia Dr. S.E.		
City/State/Zip	Washington, D.C.		20020
Phone	(301) 839-1176		
Description			

A living history farm with a mixture of 19th and 20th century tools and demonstrations. The National Parks's open door philosophy means 400-800 preschool thru 2nd grade children visit each spring day with over 100,000 visitors per year. Interpreters and volunteers work in the garden, milk the cow, brush a pony and hold chickens while groups of youth tour by. Weekend programs focus on themes such as dairy day, sheep shearing and wheat harvesting. The size of visitor groups means a focus on touch, smell, hear and see with limited opportunity for interactive, hand-on learning.

Organization	Rancho Vejar		
Contact	John Smith		
Mailing Street	37 Mountain Dr.		
City/State/Zip	Santa Barbara	CA	93103
Phone	(805) 569-1995		
Description			

The 3 acre site began in 1972 as an alternative school for hard to reach kids and is now open to school field trips. The french intensive biodynamic gardens integrate small and medium animals along with hands-on opportunities for children. Tours highlight recycling, feed storage where conversion rations and food cycles are discussed, bees and pollenization, poultry and "deep litter" composting, rabbit and worm operations, and herbs for heath and cooking. Kids gather eggs, till vegetables, prune grapes and process foods.

Publication: Bring home the bacon, 36 page booklet by John Smith full of ideas on establishing a garden, energy and animal education program.

Organization	Rock Eagle 4-H Center		
Contact	Diane Davies, Specialist in Envir. and Nat. Res.		
Mailing Street	350 Rock Eagle Road		
City/State/Zip	Eatonton	Georgia	321024-9599
Phone	404-485-2831		
Description			

Ms. Davey, 4-H Specialist in environment and natural resource sciences, worked with the Kellogg Foundation to develop and conduct a Food and Habitat Conference for Georgia youth titled "The Global Food Web: Environment, Food Supply, and Human Nutrition ...A Public Policy Education Program For Youth". This excellent high school program had positive results in Georgia and can be replicated in other states. A "Global Food Web" curriculum binder is available.

Organization	Rodale Institute Research Station - The New Farm		
Contact	Dennis Scholl		
Mailing Street	611 Siegfriedale Road		
City/State/Zip	Kutztown	PA	
Phone	(215) 683-6383		
Description			

Goal: to "develop for farmers and gardeners the information and methods to produce good crops and improve their land and lives." A tour booklet guides one through a demonstration garden (rotations, beneficial insects, trap crops, lawn care mowing trials), legume screening trials, cover crops in vegetable production, agronomy trials (soil fertility, weed control, reduction of tillage operations), apple orchard management (disease-resistant cultivars, insect trapping, matting disruption, attracting beneficial insects), and more. Specialized workshops, tours and farm days are offered.

A new youth education project was began in the spring of 1992. Courses: "From Seed to Supper" (plant growth, soil health, and nutrition) and "Clean Water - Nature's Way" (role of wetlands as nature's water purifiers) have been developed. A written curriculum is near completion.

The Station is rich in ideas and experiments in applied science. Similar trials at other farm education sites would greatly enrich interpretive programs. Newsletters and

Organization	Saul High School of Agricultural Sciences		
Contact	James Kerr, Principal		
Mailing Street	7100 Henry Ave.		
City/State/Zip	Philadelphia	PA	19128
Phone	(215) 487-4467		
Description			

The school is beginning to integrate core courses (math, social studies and English) into agricultural studies and establishing new environmental science courses. Hands-on activities are very apparent: feeding animals, cutting/wrapping meat, milking the dairy herd, mowing and caring for school landscapes, and greenhouse activity. The program has a strong vocational agricultural tradition and job training component. Applied science opportunities utilizing research plots andbiotechnology facilities need to be strengthened.

The school reflects the racial and sexual balance of the Philadelphia schools and 83% of the students go on to college or other post secondary education. The school provided seniors with two million dollars in college scholarship assistance in 1991. There is only a 16% "attrition" or drop-out rate between the freshman and senior year and a 96% daily attendance rate. This, along with the strong hands-on component, makes this urban school a unique site to visit.

Organization	Severson Dells Environmental Education Center		
Contact			
Mailing Street	8786 Montague Rd		
City/State/Zip	Rockford	IL	61102
Phone	(815) 335-2915		
Description			

Forest preserve, 160 ac operating farm, interpretative programs and newsletter. No further information.

Organization	Shelburne Farms		
Contact	Megan Camp		
Mailing Street			
City/State/Zip	Shelburne	VT	05482
Phone	(802) 985-8686		
Description			

Institute programs are designed to teach and demonstrate "the wise use of natural and agricultural resources, in the belief that we must all become more gentle stewards of our planet." The Farms, encompassing 4000 acres, was constructed as an agricultural experiment where new techniques in land use, horse breeding and dairying were employed. Today the dairy herd uses permanent cover crops of legumes and grasses in an intense grazing and rotational system. A system of liquid manure captures dairy herd waste to spread directly on the fields as fertilizer. All the milk is used for cheese making and public sales. Farm animals, orchards and gardens, a bakery and many magnificent buildings are part of the farms.

A curriculum is available titled "Project Seasons" teaches themes including "The Harvest", "Farm Life and History", "Forest Resources and Winter Tracking", "Maple Sugaring", "Dairy", "Super Soil" and "Watery Worlds". The Farms hosts public tours, school programs, teacher training courses and a docent program.

Organization	Slide Ranch		
Contact	Ross Herbertson, Director		
Mailing Street	2025 Shoreline Hwy.		
City/State/Zip	Muir Beach	CA	94965
Phone	(415) 381-6155		
Description			

A teaching farm of gardens, pasture, animals, ocean and wildlands located on the Pacific Ocean headlands of the Golden Gate National Recreation Area. The programs focus on schools, families, disabled and low income audiences. Programs are tailored to the specific learning needs of each group and vary from one to three days in length. Programs are intimate, hands-on affairs focusing on childrens' interdependence with the land and each other. Ecology, stewardship and urban-farm connections are primary education goals. Programs integrate ocean, farm and wildland settings through ecology and stewardship. An internship program provides ranch and garden instruction along with training and methodology on environmental instruction.

Organization	Springdale Farm - Monroe Co. Parks		
Contact			
Mailing Street	696 Colby St.		
City/State/Zip	Spencerport	NY	14559
Phone	(716) 352-5320		
Description			

Created as a demonstration farm, the barns and pasture contain a diverse assortment of animals. Three staff conduct tours and do farm chores. Most of the 16,000 visitors are pre-3rd grade children. Interpretative farm programs focus on the importance of agriculture and its relationship to urban audiences.

Organization	Stone Kill Farm Environmental Center - State Dept of Env. Cons.		
Contact	Herb Eschbach, Director		
Mailing Street	Rt. 9D		
City/State/Zip	Wappingers Falls	NY	12590
Phone	(914) 831-8780		
Description			

Located in the Hudson River Valley in lower New York State, the 756 acre working farm's mission is to "provide educational experience supplementing existing school or youth programs; to conduct interpretive activities for adults and families; and to train teachers and adult leaders in content and methodology of environmental education." The farm has community gardens, livestock, hay fields, ponds, and forest. Programs focus on science and environmental concepts in farming, forestry, and wildlife settings.

A unique forestry demonstration project of one acre sites include a "control plot", a "seed tree plot", a "shelter (shade / seed) woods plot" and a "clear cut" plot. Curriculum strategies are being devised for schools and public including land use planning.

Curriculum materials and fact sheets support volunteer training, teachers, and youth programs at the site. Student workbooks and fact sheets are available: "Pond Life Lessons", "Forest and Field", "Farming and You" and "Observing Ecosystems".

Organization	Sunrock Farms		
Contact	Frank Traina, Director		
Mailing Street	103 Gibson Lane		
City/State/Zip	Wilder	Kentucky	41076-9703
Phone	(606) 781-5502		
Description			

This 63 acre teaching farm outside of Cincinnati, Ohio has goats, cows, pigs, wheat, corn, and forested hillsides. Twenty part-time staff share farm and stewardship practices with 30,000 children each year. Program utilizes several small barn structures for simultaneous involvement of children in milking, hoof trimming and other livestock care along with farm arts such as apple pressing and wool spinning. The goal: to help young children understand the basics of human living and interdependence with nature.

"A Multicultural Farm Experience" enables teachers to select one or more multicultural themes. Today's American farm raises animals and plants that originated in all parts of the world. Focusing on African, Asian, European and Native American cultures, a theme covers four areas: plant and animal foods coming historically from the region; pottery and weaving traditions of the region's cultures; traditional dwellings; and origins of agriculture in the different eco-regions. Drumming, storytelling and games help weave together the day. Sunrock publishes "Pollen: Journal of Bioregional Education".

Organization	Upland Hills Farm		
Contact			
Mailing Street	481 Lake George Road		
City/State/Zip	Oxford	MI	48370
Phone	(313) 628-1611		
Description			

This 240 acre midwestern farm is located the northern suburbs of Detroit. The farm has diverse farm animals and operates a day camp, school tours, a mobile farm for school presentations and fall pumpkin festival. School programs focus on tours and demonstrations --milking, butter making, sheep shearing -- along with hayrides.

Organization	Wells National Estuarine Research Reserve		
Contact	Laudholm Farm		
Mailing Street			
City/State/Zip	Wells	ME	7/14/92
Phone			
Description			

Located were the Little and Webhannet Rivers mingle with tidal waters of the Atlantic Ocean, the site once served Native Americans gathering foods along marshes and beaches. The Laudholm Farm was established in 1643 and today the 1600 acre site is a laboratory for research and education about the fragile estuarine environment. Farm house and dairy barns serve as headquarters for this historic salt water farm. Plans include establishment of working demonstration farm. The Laudholm Trust, supports the operations of the Reserve and provides volunteer led educational programs for schools and public.

Abandoned apple orchards and hay fields are in transition to grasslands and forest. The fields are reverting to shelter for wildlife that feeds in the marsh below. It is an interesting conversion study area as well as estuarine reserve. Educational focus on conversion of cultivated lands to wild lands or on the interface between them is largely missing at agricultural education sites.

Organization	Wilder Ranch State Park		
Contact	Elizabeth Hammack		
Mailing Street	101 Madeline Drive, 1401 Coast Rd., Santa Cruz		
City/State/Zip	Aptos	CA	95003
Phone	(408) 426-0505		
Description			

4,000 acres of beach, coastal terrace, grasslands, woodlands and historic farm buildings -- a victorian house, horse barn, and outbuildings. At one time the Wilder Ranch was an prosperous dairy and later a cattle ranch. Today, educational programs focus on interpretating the turn of the century topics -- ranch life, period living, farming and architecture along with hands-on activities. The program is led by a seasonal interpreter and docents.

Organization	Woodvale Farm - W. Alton Jones Environmental Center		
Contact	Mike Hutchison, Farm Coordinator		
Mailing Street	401 Victory Hwy (Route 102)		
City/State/Zip	West Greenwich	RI	02816
Phone	(401) 397-3304		
Description			

Of the 2300 acre environmental education campus, 120 acres comprise the Woodvale farmstead. Purpose: to teach "awareness, knowledge and understanding of how each of us can actively work for a better environment." The farm emphasizes humane treatment of animals, no chemical farming, self-sustainment, historical breeds and plant varieties and experiential learning. The farm has four staff (graduate students with credit from University of Rhode Island) who operate the farm. Chores and activities are well integrated into school programs and capture ecological concepts, energy and nutrient flows, concepts of wild and domestic, food webs, plant and animal communities, and so forth. Programs serve grades 1-6 and have a 1:8-10 staff/pupil ratio.

Woodvale farm has developed a "Classroom Activity Guide" and an "Integrated Pest Management" curriculum. The center is committed to science education and curriculum development.